

AMENDMENTS TO THE CLAIMS

1. (Original) An atherectomy device for ablating an occlusion in a patient's vessel, comprising:

a flexible drive shaft;

an ablation burr rotationally coupled to the drive shaft, the ablation burr having a proximal end including at least one flexible annular disk having a center hole and an outer edge, the annular disk having an abrasive disposed on a forwardly facing surface and a distal end comprising a nose member having an abrasive leading surface; and

a catheter extending over the drive shaft, the catheter adapted to slidably receive the at least one flexible annular disk in a folded configuration.

2. (Original) The atherectomy device of Claim 1, further comprising a support member secured to the drive shaft wherein the at least one flexible annular disk is received by the support member.

3. (Original) The atherectomy device of Claim 2, wherein the at least one flexible annular disk has a plurality of radial cuts therethrough, the radial cuts each having a first end disposed at a location radially outward from the center hole and a second end disposed at the outer edge, the radial cuts defining a plurality of disk segments.

4. (Original) The atherectomy device of Claim 3, wherein the at least one flexible annular disk further comprises a plurality of small holes disposed at the first end of each radial cut.

5. (Original) The atherectomy device of Claim 3, wherein the at least one flexible annular disk comprises at least three flexible annular disks that are axially spaced apart and attached to the support member, the at least three flexible annular disks having different diameters.

LAW OFFICES OF
CHRISTENSEN O'CONNOR JOHNSON KINDNESS^{PLC}
1420 Fifth Avenue
Suite 2800
Seattle, Washington 98101
206.682.8100

6. (Original) The atherectomy device of Claim 1, wherein the abrasive comprises a plurality of diamond particles affixed to the forwardly facing surface of the flexible annular disk.

7. (Original) The atherectomy device of Claim 6, wherein diamond particles are affixed to the nose portion to form the abrasive leading surface.

8. (Original) The atherectomy device of Claim 6 wherein the nose portion has an abrasive surface formed by machining grooves into the nose portion.

9-26. (Canceled)

27. (New) An atherectomy device for ablating an occlusion in a patient's vessel, the atherectomy device comprising:

a flexible drive shaft having a distal end;

an ablation burr fixedly attached to the distal end of the flexible drive shaft, the ablation burr having a flexible portion, the flexible portion including an abrasive surface; and

a catheter extending substantially over the length of the flexible drive shaft, the catheter defining a lumen having a first diameter;

wherein the flexible portion of the ablation burr is adapted to flex between a first position, wherein the flexible portion is slidably received into the lumen, and a second position, wherein the flexible portion of the atherectomy burr has a transverse dimension greater than the catheter first diameter.

28. (New) The atherectomy device of Claim 27, wherein the flexible portion of the ablation burr comprises a plurality of annular disks fixedly attached to the flexible drive shaft, the annular disks having a plurality of radial cuts therethrough, the annular disks further having an abrasive disposed on a forwardly facing surface.

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29. (New) The atherectomy device of Claim 27, wherein the flexible portion of the ablation burr comprises an elastically deformable panel spiraling radially outward with respect to the flexible drive shaft, the panel further comprising an abrasive disposed on the outer surface.

30. (New) The atherectomy device of Claim 27, wherein the flexible portion of the ablation burr comprises a hub fixedly attachable to the drive shaft and a plurality of spaced-apart abrasive flexible struts connected to the hub and extending forwardly from the hub, the plurality of struts defining a burr volume having a proximal portion that increases in radius from the hub and a distal portion that decreases in radius from the proximal portion to the distal end of the burr, the ablation burr further comprising an compressible body substantially filling the burr volume formed by the struts.

31. (New) The atherectomy device of Claim 27, wherein the flexible portion of the burr comprises (i) a plurality of plastically deformable wires having a proximal end and a distal end, wherein the wire proximal ends are attached to the drive shaft at a first axial location, in circumferentially spaced positions, and the wire distal ends are attached to the drive shaft at a second axial location, forward of the first axial location, in corresponding circumferentially spaced positions, such that the plurality of wires can be deformed to define a generally ellipsoidal volume; and (ii) a flexible sheath disposed over the plurality of wires enclosing the generally ellipsoidal volume, the flexible sheath having a leading abrasive surface, wherein the burr can be compressed by plastically deforming the wires and can be returned to a generally ellipsoidal shape by rapidly spinning the drive shaft.

32. (New) The atherectomy device of Claim 27, wherein the flexible portion of the burr comprises a nose attached to the distal end of the drive shaft and a shell extending proximally from the nose, wherein the nose has a leading surface, and the shell has a semirigid center portion having a maximum diameter greater than the nose, wherein the semirigid center

portion can be elastically deformed to reduce its maximum diameter, and the semirigid center portion further comprises an abrasive outer surface.

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